

## SEQUENCE LISTING

<110> Tsukahara, Kappei  
 Tsuchiya, Mamiko  
 Jigami, Yoshifumi  
 Nakayama, Kenichi  
 Umemura, Mariko  
 Okamoto, Michiyo

<120> METHOD OF SCREENING FOR COMPOUNDS THAT  
 INHIBIT THE ENZYMATIC ACTIVITY OF GWT1 GENE PRODUCT

<130> 082368-004400US

<150> PCT/JP03/14909

<151> 2003-11-21

<150> JP 2002-339418

<151> 2002-11-22

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<213> Saccharomyces cerevisiae

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Ala Val Thr Ser Ile Ala Leu Val Thr Tyr Ile Ser Trp Asn Leu Leu	
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Lys Asn Ser Asn Leu Met Pro Pro Gly Ile Ser Ser Val Gln Tyr Ile	
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<212> PRT

<213> Candida albicans

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Gly	Val	Gly	Ser	Phe	Val	Phe	Ser	Met	Gly	Leu	Ala	Asn	Ser	Arg	Gln
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	210					215					220				
His	Glu	Thr	Glu	Tyr	Gly	Ile	His	Trp	Asn	Phe	Phe	Phe	Thr	Leu	Gly
225					230					235					240
Phe	Leu	Pro	Ile	Val	Leu	Gly	Ile	Leu	Asp	Pro	Val	Leu	Asn	Leu	Val
				245					250					255	
Pro	Arg	Phe	Ile	Ile	Gly	Ile	Gly	Ile	Ser	Ile	Ala	Tyr	Glu	Val	Ala
			260				265						270		
Leu	Asn	Lys	Thr	Gly	Leu	Leu	Lys	Phe	Ile	Leu	Ser	Ser	Glu	Asn	Arg
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305					310					315					320
Leu	Thr	Gly	Tyr	Lys	Thr	Lys	Asn	Asn	Leu	Ile	Thr	Ile	Ser	Lys	Ile
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Arg	Ile	Ser	Lys	Lys	Gln	His	Lys	Lys	Glu	Leu	Leu	Leu	Phe	Phe	Ser
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Val	Ala	Thr	Thr	Gln	Gly	Leu	Tyr	Leu	Ala	Cys	Ile	Phe	Tyr	His	Leu
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Ala	Phe	Ser	Leu	Phe	Ile	Ser	Asn	Leu	Ser	Phe	Leu	Gln	Pro	Ile	Ser
	370					375					380				
Arg	Arg	Leu	Ala	Asn	Phe	Pro	Tyr	Val	Met	Trp	Val	Val	Ser	Tyr	Asn
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Ala	Thr	Phe	Leu	Leu	Cys	Tyr	Asp	Leu	Ile	Glu	Lys	Phe	Ile	Pro	Gly



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Asn Leu Thr Ser Thr Val Leu Asp Ser Ile Asn Asn Asn Gly Leu Phe		
420	425	430
Ile Phe Leu Val Ser Asn Leu Leu Thr Gly Phe Ile Asn Met Ser Ile		
435	440	445
Asn Thr Leu Glu Thr Ser Asn Lys Met Ala Val Ile Ile Leu Ile Gly		
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Thr Gly Gly Thr Ile Glu Glu Ile Tyr Ala Val Thr Ser Ile Ala Leu	
20 25 30	
tca tct tat ttg tcc ttt aga ttg ttg aaa aag tct ctt ggt gat tta	144
Ser Ser Tyr Leu Ser Phe Arg Leu Leu Lys Lys Ser Leu Gly Asp Leu	
35 40 45	
gct ttg att tac gac tac att ctt aat gtg ttg aca att cta gca tcc	192
Ala Leu Ile Tyr Asp Tyr Ile Leu Asn Val Leu Thr Ile Leu Ala Ser	
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att act gtt tat agc aac agc cct tct tat ttg cat tat ttt att gtt	240
Ile Thr Val Tyr Ser Asn Ser Pro Ser Tyr Leu His Tyr Phe Ile Val	
65 70 75 80	
att cca tca tta gtt ata tat cta gtg aat tac cat gtt gag aaa cca	288
Ile Pro Ser Leu Val Ile Tyr Leu Val Asn Tyr His Val Glu Lys Pro	
85 90 95	
tct tca ccc cat aga caa aat gat aca aaa gaa gat aaa tcg gac gaa	336
Ser Ser Pro His Arg Gln Asn Asp Thr Lys Glu Asp Lys Ser Asp Glu	
100 105 110	
cta ttg ccg aga aaa caa ttt ata aca gcc tat cgt tct caa atg ttg	384
Leu Leu Pro Arg Lys Gln Phe Ile Thr Ala Tyr Arg Ser Gln Met Leu	
115 120 125	
ata att act aat cta gct ata tta gct gtt gat ttt cct att ttc cca	432

Ile	Ile	Thr	Asn	Leu	Ala	Ile	Leu	Ala	Val	Asp	Phe	Pro	Ile	Phe	Pro		
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Arg	Arg	Phe	Ala	Lys	Val	Glu	Thr	Trp	Gly	Thr	Ser	Met	Met	Asp	Leu		
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Gly	Val	Gly	Ser	Phe	Val	Phe	Ser	Met	Gly	Leu	Ala	Asn	Ser	Arg	Gln		
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ttg	atc	aag	aac	cac	acc	gac	aat	tac	aaa	ttt	agt	tgg	aag	agt	tat	576	
Leu	Ile	Lys	Asn	His	Thr	Asp	Asn	Tyr	Lys	Phe	Ser	Trp	Lys	Ser	Tyr		
			180					185					190				
ttg	aaa	aca	atc	aag	cag	aac	ttt	atc	aag	tca	gtg	cct	ata	ctt	gtt	624	
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tta	gga	gct	att	cgt	ttt	gtt	agt	gtt	aag	caa	ttg	gac	tat	cag	gaa	672	
Leu	Gly	Ala	Ile	Arg	Phe	Val	Ser	Val	Lys	Gln	Leu	Asp	Tyr	Gln	Glu		
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His	Glu	Thr	Glu	Tyr	Gly	Ile	His	Trp	Asn	Phe	Phe	Phe	Thr	Leu	Gly		
225					230					235					240		
ttc	ttg	cca	att	gta	ttg	gga	ata	tta	gac	ccg	gtg	ttg	aat	ttg	gtt	768	
Phe	Leu	Pro	Ile	Val	Leu	Gly	Ile	Leu	Asp	Pro	Val	Leu	Asn	Leu	Val		
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cca	cgc	ttc	ata	ata	gga	att	ggt	atc	tca	att	ggt	tat	gag	gta	gcg	816	
Pro	Arg	Phe	Ile	Ile	Gly	Ile	Gly	Ile	Ser	Ile	Gly	Tyr	Glu	Val	Ala		
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Leu	Asn	Lys	Thr	Gly	Leu	Leu	Lys	Phe	Ile	Leu	Ser	Ser	Glu	Asn	Arg		
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Gly	Tyr	Leu	Cys	Ile	Phe	Ile	Ile	Gly	Gln	Ser	Phe	Gly	Ser	Phe	Val		
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Leu	Thr	Gly	Tyr	Lys	Thr	Lys	Asn	Asn	Leu	Ile	Thr	Ile	Ser	Lys	Ile		
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cgt	att	tca	aaa	aaa	caa	cac	aag	aaa	gag	ctg	ctg	ctg	ttt	ttc	tca	1056	
Arg	Ile	Ser	Lys	Lys	Gln	His	Lys	Lys	Glu	Leu	Leu	Leu	Phe	Phe	Ser		
			340					345					350				
gtc	gcc	act	act	cag	gga	tta	tat	ttg	gca	tgt	atc	ttc	tat	cac	tta	1104	
Val	Ala	Thr	Thr	Gln	Gly	Leu	Tyr	Leu	Ala	Cys	Ile	Phe	Tyr	His	Leu		
		355					360					365					
gct	ttc	agt	ttg	ttc	atc	agc	aac	tta	tca	ttc	ttg	caa	cca	att	tca	1152	
Ala	Phe	Ser	Leu	Phe	Ile	Ser	Asn	Leu	Ser	Phe	Leu	Gln	Pro	Ile	Ser		

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Arg Arg Leu Ala Asn Phe Pro Tyr Val Met Trp Val Val Ser Tyr Asn			
385	390	395	400
gct acg ttt tta tta tgt tat gac tta att gaa aaa ttt atc ccg ggg			1248
Ala Thr Phe Leu Leu Cys Tyr Asp Leu Ile Glu Lys Phe Ile Pro Gly			
	405	410	415
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Asn Leu Thr Ser Thr Val Leu Asp Ser Ile Asn Asn Asn Gly Leu Phe			
	420	425	430
atc ttc ttg gtc agc aat tta tta aca ggg ttt att aac atg tcc atc			1344
Ile Phe Leu Val Ser Asn Leu Leu Thr Gly Phe Ile Asn Met Ser Ile			
	435	440	445
aac act ttg gaa act agc aat aaa atg gca gtg att atc ttg att ggc			1392
Asn Thr Leu Glu Thr Ser Asn Lys Met Ala Val Ile Ile Leu Ile Gly			
	450	455	460
tat agt ctt act tgg aca ttg ctc gcc tta tat ttg gat aag agg aag			1440
Tyr Ser Leu Thr Trp Thr Leu Leu Ala Leu Tyr Leu Asp Lys Arg Lys			
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atc tac atc aag ctt tag			1458
Ile Tyr Ile Lys Leu			
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35	45
Ala Leu Ile Tyr Asp Tyr Ile Leu Asn Val Leu Thr Ile Leu Ala Ser	
50	60
Ile Thr Val Tyr Ser Asn Ser Pro Ser Tyr Leu His Tyr Phe Ile Val	
65	80
Ile Pro Ser Leu Val Ile Tyr Leu Val Asn Tyr His Val Glu Lys Pro	
85	95
Ser Ser Pro His Arg Gln Asn Asp Thr Lys Glu Asp Lys Ser Asp Glu	
100	110
Leu Leu Pro Arg Lys Gln Phe Ile Thr Ala Tyr Arg Ser Gln Met Leu	
115	125

Ile	Ile	Thr	Asn	Leu	Ala	Ile	Leu	Ala	Val	Asp	Phe	Pro	Ile	Phe	Pro	
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Gly	Val	Gly	Ser	Phe	Val	Phe	Ser	Met	Gly	Leu	Ala	Asn	Ser	Arg	Gln	
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Leu	Ile	Lys	Asn	His	Thr	Asp	Asn	Tyr	Lys	Phe	Ser	Trp	Lys	Ser	Tyr	
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Leu	Lys	Thr	Ile	Lys	Gln	Asn	Phe	Ile	Lys	Ser	Val	Pro	Ile	Leu	Val	
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Leu	Gly	Ala	Ile	Arg	Phe	Val	Ser	Val	Lys	Gln	Leu	Asp	Tyr	Gln	Glu	
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Phe	Leu	Pro	Ile	Val	Leu	Gly	Ile	Leu	Asp	Pro	Val	Leu	Asn	Leu	Val	
				245					250					255		
Pro	Arg	Phe	Ile	Ile	Gly	Ile	Gly	Ile	Ser	Ile	Gly	Tyr	Glu	Val	Ala	
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Leu	Asn	Lys	Thr	Gly	Leu	Leu	Lys	Phe	Ile	Leu	Ser	Ser	Glu	Asn	Arg	
		275					280					285				
Leu	Glu	Ser	Leu	Ile	Ala	Met	Asn	Lys	Glu	Gly	Ile	Phe	Ser	Phe	Ile	
	290					295					300					
Gly	Tyr	Leu	Cys	Ile	Phe	Ile	Ile	Gly	Gln	Ser	Phe	Gly	Ser	Phe	Val	
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Leu	Thr	Gly	Tyr	Lys	Thr	Lys	Asn	Asn	Leu	Ile	Thr	Ile	Ser	Lys	Ile	
				325					330					335		
Arg	Ile	Ser	Lys	Lys	Gln	His	Lys	Lys	Glu	Leu	Leu	Leu	Phe	Phe	Ser	
			340					345					350			
Val	Ala	Thr	Thr	Gln	Gly	Leu	Tyr	Leu	Ala	Cys	Ile	Phe	Tyr	His	Leu	
		355					360					365				
Ala	Phe	Ser	Leu	Phe	Ile	Ser	Asn	Leu	Ser	Phe	Leu	Gln	Pro	Ile	Ser	
	370					375					380					
Arg	Arg	Leu	Ala	Asn	Phe	Pro	Tyr	Val	Met	Trp	Val	Val	Ser	Tyr	Asn	
385				390						395					400	
Ala	Thr	Phe	Leu	Leu	Cys	Tyr	Asp	Leu	Ile	Glu	Lys	Phe	Ile	Pro	Gly	
				405					410					415		
Asn	Leu	Thr	Ser	Thr	Val	Leu	Asp	Ser	Ile	Asn	Asn	Asn	Gly	Leu	Phe	
			420					425					430			
Ile	Phe	Leu	Val	Ser	Asn	Leu	Leu	Thr	Gly	Phe	Ile	Asn	Met	Ser	Ile	
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Asn	Thr	Leu	Glu	Thr	Ser	Asn	Lys	Met	Ala	Val	Ile	Ile	Leu	Ile	Gly	

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Ile Tyr Ile Lys Leu					
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tca agt tcc att gag aca tgt ggc ttg tta tta ata gga att gct tgc					96
Ser Ser Ser Ile Glu Thr Cys Gly Leu Leu Leu Ile Gly Ile Ala Cys					
	20	25	30		
aac gtt ttg tgg gta aac atg act gcg aga aac atc tta ccc aaa ggg					144
Asn Val Leu Trp Val Asn Met Thr Ala Arg Asn Ile Leu Pro Lys Gly					
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aat ctt ggg ttt ctt gtt gag ttt ttc atc ttt tgc tta att cca tta					192
Asn Leu Gly Phe Leu Val Glu Phe Phe Ile Phe Cys Leu Ile Pro Leu					
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ttt gtc att tac gtt tca tgc aaa gtt ggc gtt ttc act ctt tgc ata					240
Phe Val Ile Tyr Val Ser Ser Lys Val Gly Val Phe Thr Leu Cys Ile					
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gcc tct ttt ttg cct tcc ttc gtc ctt cat gtt ata agt cca att aat					288
Ala Ser Phe Leu Pro Ser Phe Val Leu His Val Ile Ser Pro Ile Asn					
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tgg gat gtg ctg aga aga aaa cct ggt tgt tgt ctt act aaa aaa aat					336
Trp Asp Val Leu Arg Arg Lys Pro Gly Cys Cys Leu Thr Lys Lys Asn					
	100	105	110		
gaa aat act ttt gat cga cga att gct gga gtc aca ttt tat cgt tct					384
Glu Asn Thr Phe Asp Arg Arg Ile Ala Gly Val Thr Phe Tyr Arg Ser					
	115	120	125		
caa atg atg ttg gtt act gtc act tgc atc ctg gcc gtt gac ttt acc					432
Gln Met Met Leu Val Thr Val Thr Cys Ile Leu Ala Val Asp Phe Thr					
	130	135	140		
ctt ttc ccg agg aga tat gcc aaa gtt gaa acc tgg gga aca tca ctg					480
Leu Phe Pro Arg Arg Tyr Ala Lys Val Glu Thr Trp Gly Thr Ser Leu					
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atg gat ctt ggt gtt gga tct ttc atg ttt tct tca ggt act gtg gct					528

Met	Asp	Leu	Gly	Val	Gly	Ser	Phe	Met	Phe	Ser	Ser	Gly	Thr	Val	Ala		
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Gly	Arg	Lys	Asn	Asp	Ile	Lys	Lys	Pro	Asn	Ala	Phe	Lys	Asn	Val	Leu		
			180					185					190				
tgg	aat	tct	ttc	atc	ctt	ttg	att	tta	gga	ttt	gcg	cgc	atg	ttt	tta		624
Trp	Asn	Ser	Phe	Ile	Leu	Leu	Ile	Leu	Gly	Phe	Ala	Arg	Met	Phe	Leu		
		195					200					205					
acg	aaa	agc	atc	aat	tac	caa	gaa	cat	gta	agc	gaa	tat	ggc	atg	cat		672
Thr	Lys	Ser	Ile	Asn	Tyr	Gln	Glu	His	Val	Ser	Glu	Tyr	Gly	Met	His		
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Trp	Asn	Phe	Phe	Phe	Thr	Leu	Gly	Phe	Met	Ala	Leu	Gly	Val	Phe	Phe		
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Phe	Arg	Arg	Ser	Leu	Lys	Lys	Val	Ser	Tyr	Phe	Asn	Leu	Ala	Thr	Phe		
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Ile	Thr	Leu	Leu	His	His	Cys	Leu	Leu	Val	Leu	Thr	Pro	Phe	Gln	Lys		
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Trp	Ala	Leu	Ser	Ala	Pro	Arg	Thr	Asn	Ile	Leu	Ala	Gln	Asn	Arg	Glu		
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ggt	att	gct	tct	ctt	ccc	gga	tac	att	gct	att	tac	ttt	tat	gga	atg		912
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Tyr	Thr	Gly	Ser	Val	Val	Leu	Ala	Asp	Arg	Pro	Leu	Met	Tyr	Thr	Arg		
305					310				315						320		
gct	gag	tcg	tgg	aag	cgc	ttt	caa	cgt	cta	tta	ttc	ccg	cta	tgc	att		1008
Ala	Glu	Ser	Trp	Lys	Arg	Phe	Gln	Arg	Leu	Leu	Phe	Pro	Leu	Cys	Ile		
				325					330					335			
ttg	tta	gtg	ttg	tat	ctt	gtg	tct	aac	ttt	ttg	tca	gtt	ggt	gtt	tct		1056
Leu	Leu	Val	Leu	Tyr	Leu	Val	Ser	Asn	Phe	Leu	Ser	Val	Gly	Val	Ser		
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cgc	cga	ctt	gct	aat	acg	cct	tat	gtt	gcg	aat	gtt	gcc	ttt	atc	aat		1104
Arg	Arg	Leu	Ala	Asn	Thr	Pro	Tyr	Val	Ala	Asn	Val	Ala	Phe	Ile	Asn		
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atg	ttt	ttt	ctt	act	ata	tac	ata	ctt	att	gat	gcc	tat	tta	ttc	cca		1152
Met	Phe	Phe	Leu	Thr	Ile	Tyr	Ile	Leu	Ile	Asp	Ala	Tyr	Leu	Phe	Pro		
	370				375						380						
tct	tct	gtg	cca	tat	gga	agt	cgc	gtc	ccc	aaa	ctg	ctt	gaa	gat	gcc		1200
Ser	Ser	Val	Pro	Tyr	Gly	Ser	Arg	Val	Pro	Lys	Leu	Leu	Glu	Asp	Ala		
385					390					395					400		
aat	aat	aat	ggc	ttg	ttg	gtg	ttt	ttg	att	gct	aac	gtt	tta	aca	gga		1248
Asn	Asn	Asn	Gly	Leu	Leu	Val	Phe	Leu	Ile	Ala	Asn	Val	Leu	Thr	Gly		

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gta	gtt	aat	tta	tcg	ttc	gac	acc	ctt	cat	tct	agc	aat	gca	aaa	ggc	1296				
Val	Val	Asn	Leu	Ser	Phe	Asp	Thr	Leu	His	Ser	Ser	Asn	Ala	Lys	Gly					
			420						425				430							
ttg	aca	atc	atg	act	atg	tat	ctt	ttt	att	att	tgc	tat	atg	gca	cat	1344				
Leu	Thr	Ile	Met	Thr	Met	Tyr	Leu	Phe	Ile	Ile	Cys	Tyr	Met	Ala	His					
		435						440				445								
tgg	ctt	gct	caa	cac	gga	att	cgt	ttt	cgc	ctt	tag					1380				
Trp	Leu	Ala	Gln	His	Gly	Ile	Arg	Phe	Arg	Leu										
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 <212> PRT  
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Asn	Val	Leu	Trp	Val	Asn	Met	Thr	Ala	Arg	Asn	Ile	Leu	Pro	Lys	Gly
		35					40					45			
Asn	Leu	Gly	Phe	Leu	Val	Glu	Phe	Phe	Ile	Phe	Cys	Leu	Ile	Pro	Leu
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Phe	Val	Ile	Tyr	Val	Ser	Ser	Lys	Val	Gly	Val	Phe	Thr	Leu	Cys	Ile
	65				70						75				80
Ala	Ser	Phe	Leu	Pro	Ser	Phe	Val	Leu	His	Val	Ile	Ser	Pro	Ile	Asn
				85					90					95	
Trp	Asp	Val	Leu	Arg	Arg	Lys	Pro	Gly	Cys	Cys	Leu	Thr	Lys	Lys	Asn
		100						105					110		
Glu	Asn	Thr	Phe	Asp	Arg	Arg	Ile	Ala	Gly	Val	Thr	Phe	Tyr	Arg	Ser
		115					120					125			
Gln	Met	Met	Leu	Val	Thr	Val	Thr	Cys	Ile	Leu	Ala	Val	Asp	Phe	Thr
	130					135					140				
Leu	Phe	Pro	Arg	Arg	Tyr	Ala	Lys	Val	Glu	Thr	Trp	Gly	Thr	Ser	Leu
	145				150						155				160
Met	Asp	Leu	Gly	Val	Gly	Ser	Phe	Met	Phe	Ser	Ser	Gly	Thr	Val	Ala
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Gly	Arg	Lys	Asn	Asp	Ile	Lys	Lys	Pro	Asn	Ala	Phe	Lys	Asn	Val	Leu
			180					185					190		
Trp	Asn	Ser	Phe	Ile	Leu	Leu	Ile	Leu	Gly	Phe	Ala	Arg	Met	Phe	Leu
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Thr	Lys	Ser	Ile	Asn	Tyr	Gln	Glu	His	Val	Ser	Glu	Tyr	Gly	Met	His

210	215	220
Trp Asn Phe Phe Phe Thr Leu Gly Phe Met Ala Leu Gly Val Phe Phe		
225	230	235 240
Phe Arg Arg Ser Leu Lys Lys Val Ser Tyr Phe Asn Leu Ala Thr Phe		
	245	250 255
Ile Thr Leu Leu His His Cys Leu Leu Val Leu Thr Pro Phe Gln Lys		
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Trp Ala Leu Ser Ala Pro Arg Thr Asn Ile Leu Ala Gln Asn Arg Glu		
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Gly Ile Ala Ser Leu Pro Gly Tyr Ile Ala Ile Tyr Phe Tyr Gly Met		
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Tyr Thr Gly Ser Val Val Leu Ala Asp Arg Pro Leu Met Tyr Thr Arg		
305	310	315 320
Ala Glu Ser Trp Lys Arg Phe Gln Arg Leu Leu Phe Pro Leu Cys Ile		
	325	330 335
Leu Leu Val Leu Tyr Leu Val Ser Asn Phe Leu Ser Val Gly Val Ser		
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Arg Arg Leu Ala Asn Thr Pro Tyr Val Ala Asn Val Ala Phe Ile Asn		
	355	360 365
Met Phe Phe Leu Thr Ile Tyr Ile Leu Ile Asp Ala Tyr Leu Phe Pro		
370	375	380
Ser Ser Val Pro Tyr Gly Ser Arg Val Pro Lys Leu Leu Glu Asp Ala		
385	390	395 400
Asn Asn Asn Gly Leu Leu Val Phe Leu Ile Ala Asn Val Leu Thr Gly		
	405	410 415
Val Val Asn Leu Ser Phe Asp Thr Leu His Ser Ser Asn Ala Lys Gly		
	420	425 430
Leu Thr Ile Met Thr Met Tyr Leu Phe Ile Ile Cys Tyr Met Ala His		
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54



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Lys Glu Ala Phe Val Ser Gly Leu Ala Gly Gly Ser Ile Leu Glu Ile	
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Asn Ala Val Thr Leu Val Ala Ser Val Ser Val Phe Leu Trp Ser Ile	
25 30 35 40	
cta caa tct cgc cta tcc ttt ttc aca ccc tac agc gcc gct gcc ctt	198
Leu Gln Ser Arg Leu Ser Phe Phe Thr Pro Tyr Ser Ala Ala Ala Leu	
45 50 55	
ctc gtt gat ttc ctg ctc aat gta cta gct atc ttg ttc gca acc act	246
Leu Val Asp Phe Leu Leu Asn Val Leu Ala Ile Leu Phe Ala Thr Thr	
60 65 70	
tta tac tct tcg gcg cct ctt ctt ctc aat ctc ctt cta ata tct ccc	294
Leu Tyr Ser Ser Ala Pro Leu Leu Leu Asn Leu Leu Leu Ile Ser Pro	
75 80 85	
gct ctg ctg ata ctc ctc tct acg aaa cgt cct cgg acc ccc gtc aaa	342
Ala Leu Leu Ile Leu Leu Ser Thr Lys Arg Pro Arg Thr Pro Val Lys	
90 95 100	
gcg aaa cct cct cgc cag tcc gct aga gct ggg aaa gat gac tcg aaa	390
Ala Lys Pro Pro Arg Gln Ser Ala Arg Ala Gly Lys Asp Asp Ser Lys	
105 110 115 120	
cat gcg aca gcc ttg cca gag tct cta ccc att cat cca ttt ctc acg	438
His Ala Thr Ala Leu Pro Glu Ser Leu Pro Ile His Pro Phe Leu Thr	
125 130 135	
aca tat cgc gcc gcc atg atg gtt atc acg tgc atc gct atc ttg gct	486
Thr Tyr Arg Ala Ala Met Met Val Ile Thr Cys Ile Ala Ile Leu Ala	
140 145 150	
gtg gat ttt cgc att ttt cct cgc cga ttc gcc aag gta gaa aac tgg	534
Val Asp Phe Arg Ile Phe Pro Arg Arg Phe Ala Lys Val Glu Asn Trp	
155 160 165	
ggg aca tca ctc atg gat ctg ggc gtt gga tcg ttt gtc ttt tcg ggc	582
Gly Thr Ser Leu Met Asp Leu Gly Val Gly Ser Phe Val Phe Ser Gly	
170 175 180	
gga gta gta tcc gct cgc tca cta ctc aag agc agg acc aat ggc tct	630
Gly Val Val Ser Ala Arg Ser Leu Leu Lys Ser Arg Thr Asn Gly Ser	
185 190 195 200	
aaa agg ttg cct ctt gcc aag agg ttg att gcg tcg acg cga cac tct	678
Lys Arg Leu Pro Leu Ala Lys Arg Leu Ile Ala Ser Thr Arg His Ser	
205 210 215	
att cct ctg ctc gtc ctc ggc ctg att cgg cta tac agc gtc aaa ggc	726
Ile Pro Leu Leu Val Leu Gly Leu Ile Arg Leu Tyr Ser Val Lys Gly	
220 225 230	
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Leu Asp Tyr Ala Glu His Val Thr Glu Tyr Gly Val His Trp Asn Phe	
235 240 245	

ttc ttt aca ttg ggt ctt ttg cct ccg ttc gtg gag gtc ttc gac gcc	822
Phe Phe Thr Leu Gly Leu Leu Pro Pro Phe Val Glu Val Phe Asp Ala	
250 255 260	
ttg gct acg atc att ccg tca tac gag gtt ctc tcc gtg ggg atc gcc	870
Leu Ala Thr Ile Ile Pro Ser Tyr Glu Val Leu Ser Val Gly Ile Ala	
265 270 275 280	
gtc ttg tat caa gtt gcc cta gag tca aca gac ttg aaa agc tac atc	918
Val Leu Tyr Gln Val Ala Leu Glu Ser Thr Asp Leu Lys Ser Tyr Ile	
285 290 295	
ctc gtc tcc cct cgt ggg cca agc tta ctg tcc aag aat cgt gaa ggc	966
Leu Val Ser Pro Arg Gly Pro Ser Leu Leu Ser Lys Asn Arg Glu Gly	
300 305 310	
gtc ttc tcc ttc tca ggt tat ctc gcg att ttt ctt gct ggt cgt gcg	1014
Val Phe Ser Phe Ser Gly Tyr Leu Ala Ile Phe Leu Ala Gly Arg Ala	
315 320 325	
atc ggc att ccg ata atc cct cgc gga act tct ttc tca aga agc cca	1062
Ile Gly Ile Arg Ile Ile Pro Arg Gly Thr Ser Phe Ser Arg Ser Pro	
330 335 340	
gaa cag gcc agg aga ccg gtc ctg atc agc ctt ggc gtg caa gcg tta	1110
Glu Gln Ala Arg Arg Arg Val Leu Ile Ser Leu Gly Val Gln Ala Leu	
345 350 355 360	
gtg tgg acc act ctt ttt gtg ttg aac tcc act tat gcg atg gga tac	1158
Val Trp Thr Thr Leu Phe Val Leu Asn Ser Thr Tyr Ala Met Gly Tyr	
365 370 375	
gga gct aat atc cct gtc tcc cgc cgc ctc gct aac atg ccc tat gtc	1206
Gly Ala Asn Ile Pro Val Ser Arg Arg Leu Ala Asn Met Pro Tyr Val	
380 385 390	
ctt tgg gtt tcg gcg ttc aac acc gcg caa ctg ttt gtg ttc tgc ctg	1254
Leu Trp Val Ser Ala Phe Asn Thr Ala Gln Leu Phe Val Phe Cys Leu	
395 400 405	
atc gaa aca ctc tgc ttt cct gca gtt cat ccg aca acg act caa gag	1302
Ile Glu Thr Leu Cys Phe Pro Ala Val His Arg Thr Thr Thr Gln Glu	
410 415 420	
agc gaa tct gag cga gtc gat ttt gct acg agc cga atc atg tcg gcc	1350
Ser Glu Ser Glu Arg Val Asp Phe Ala Thr Ser Arg Ile Met Ser Ala	
425 430 435 440	
ttc aat aag aac agt ctc gcg atc ttt ctt ttg gcc aat ctt ctg act	1398
Phe Asn Lys Asn Ser Leu Ala Ile Phe Leu Leu Ala Asn Leu Leu Thr	
445 450 455	
gga gct gtg aat ctg agc atc tcc aca att gat gct aat aca gcg cag	1446
Gly Ala Val Asn Leu Ser Ile Ser Thr Ile Asp Ala Asn Thr Ala Gln	
460 465 470	
gcc atc gct gtt ctc att gga tat tca tcc att atc aca ggg gtt gct	1494
Ala Ile Ala Val Leu Ile Gly Tyr Ser Ser Ile Ile Thr Gly Val Ala	
475 480 485	
cta gca ttg cat cat gcc aat atc aaa gta ctt cct ttc tag	1536

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1576

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 35 40 45  
 Thr Pro Tyr Ser Ala Ala Ala Leu Leu Val Asp Phe Leu Leu Asn Val  
 50 55 60  
 Leu Ala Ile Leu Phe Ala Thr Thr Leu Tyr Ser Ser Ala Pro Leu Leu  
 65 70 75 80  
 Leu Asn Leu Leu Leu Ile Ser Pro Ala Leu Leu Ile Leu Leu Ser Thr  
 85 90 95  
 Lys Arg Pro Arg Thr Pro Val Lys Ala Lys Pro Pro Arg Gln Ser Ala  
 100 105 110  
 Arg Ala Gly Lys Asp Asp Ser Lys His Ala Thr Ala Leu Pro Glu Ser  
 115 120 125  
 Leu Pro Ile His Pro Phe Leu Thr Thr Tyr Arg Ala Ala Met Met Val  
 130 135 140  
 Ile Thr Cys Ile Ala Ile Leu Ala Val Asp Phe Arg Ile Phe Pro Arg  
 145 150 155 160  
 Arg Phe Ala Lys Val Glu Asn Trp Gly Thr Ser Leu Met Asp Leu Gly  
 165 170 175  
 Val Gly Ser Phe Val Phe Ser Gly Gly Val Val Ser Ala Arg Ser Leu  
 180 185 190  
 Leu Lys Ser Arg Thr Asn Gly Ser Lys Arg Leu Pro Leu Ala Lys Arg  
 195 200 205  
 Leu Ile Ala Ser Thr Arg His Ser Ile Pro Leu Leu Val Leu Gly Leu  
 210 215 220  
 Ile Arg Leu Tyr Ser Val Lys Gly Leu Asp Tyr Ala Glu His Val Thr  
 225 230 235 240  
 Glu Tyr Gly Val His Trp Asn Phe Phe Phe Thr Leu Gly Leu Leu Pro  
 245 250 255

Pro Phe Val Glu Val Phe Asp Ala Leu Ala Thr Ile Ile Pro Ser Tyr  
 260 265 270  
 Glu Val Leu Ser Val Gly Ile Ala Val Leu Tyr Gln Val Ala Leu Glu  
 275 280 285  
 Ser Thr Asp Leu Lys Ser Tyr Ile Leu Val Ser Pro Arg Gly Pro Ser  
 290 295 300  
 Leu Leu Ser Lys Asn Arg Glu Gly Val Phe Ser Phe Ser Gly Tyr Leu  
 305 310 315 320  
 Ala Ile Phe Leu Ala Gly Arg Ala Ile Gly Ile Arg Ile Ile Pro Arg  
 325 330 335  
 Gly Thr Ser Phe Ser Arg Ser Pro Glu Gln Ala Arg Arg Arg Val Leu  
 340 345 350  
 Ile Ser Leu Gly Val Gln Ala Leu Val Trp Thr Thr Leu Phe Val Leu  
 355 360 365  
 Asn Ser Thr Tyr Ala Met Gly Tyr Gly Ala Asn Ile Pro Val Ser Arg  
 370 375 380  
 Arg Leu Ala Asn Met Pro Tyr Val Leu Trp Val Ser Ala Phe Asn Thr  
 385 390 395 400  
 Ala Gln Leu Phe Val Phe Cys Leu Ile Glu Thr Leu Cys Phe Pro Ala  
 405 410 415  
 Val His Arg Thr Thr Thr Gln Glu Ser Glu Ser Glu Arg Val Asp Phe  
 420 425 430  
 Ala Thr Ser Arg Ile Met Ser Ala Phe Asn Lys Asn Ser Leu Ala Ile  
 435 440 445  
 Phe Leu Leu Ala Asn Leu Leu Thr Gly Ala Val Asn Leu Ser Ile Ser  
 450 455 460  
 Thr Ile Asp Ala Asn Thr Ala Gln Ala Ile Ala Val Leu Ile Gly Tyr  
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Glu Ala Phe Val Ser Gly Leu Ala Gly Gly Ser Ile Leu Glu Ile Asn
10           15           20           25

gcc gtc acc ttg gtt gct tcg gttcgtgtta ctatcttatt gtggctactt 151
Ala Val Thr Leu Val Ala Ser
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cgcctacatt gtttctcgac taaccgagtc tctttgcgat caatcag gta tcc gtt 207
                               Val Ser Val
                               35

ttt ctg tgg tca att cta caa tct cgc cta tcc ttt ttc aca ccc tac 255
Phe Leu Trp Ser Ile Leu Gln Ser Arg Leu Ser Phe Phe Thr Pro Tyr
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agc gcc gct gcc ctt ctc gtt gat ttc ctg ctc aat gta cta gct atc 303
Ser Ala Ala Ala Leu Leu Val Asp Phe Leu Leu Asn Val Leu Ala Ile
                55           60           65

ttg ttc gca acc act tta tac tct tcg gcg cct ctt ctt ctc aat ctc 351
Leu Phe Ala Thr Thr Leu Tyr Ser Ser Ala Pro Leu Leu Leu Asn Leu
                70           75           80

ctt cta ata tct ccc gct ctg ctg ata ctc ctc tct acg aaa cgt cct 399
Leu Leu Ile Ser Pro Ala Leu Leu Ile Leu Leu Ser Thr Lys Arg Pro
                85           90           95

cgg acc ccc gtc aaa gcg aaa cct cct cgc cag tcc gct aga gct ggg 447
Arg Thr Pro Val Lys Ala Lys Pro Pro Arg Gln Ser Ala Arg Ala Gly
100           105           110           115

aaa gat gac tcg aaa cat gcg aca gcc ttg cca gag tct cta ccc att 495
Lys Asp Asp Ser Lys His Ala Thr Ala Leu Pro Glu Ser Leu Pro Ile
                120           125           130

cat cca ttt ctc acg aca tat cgc gcc gcc atg atg gtt atc acg tgc 543
His Pro Phe Leu Thr Thr Tyr Arg Ala Ala Met Met Val Ile Thr Cys
                135           140           145

atc gct atc ttg gct gtg gat ttt cgc att ttt cct cgc cga ttc gcc 591
Ile Ala Ile Leu Ala Val Asp Phe Arg Ile Phe Pro Arg Arg Phe Ala
                150           155           160

aag gta gaa aac tgg ggt aca tca ctc atg gat ctg ggc gtt gga tcg 639
Lys Val Glu Asn Trp Gly Thr Ser Leu Met Asp Leu Gly Val Gly Ser
                165           170           175

ttt gtc ttt tcg ggc gga gta gta tcc gct cgc tca cta ctc aag agc 687
Phe Val Phe Ser Gly Gly Val Val Ser Ala Arg Ser Leu Leu Lys Ser
180           185           190           195
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Arg Thr Asn Gly Ser Lys Arg Leu Pro Leu Ala Lys Arg Leu Ile Ala	
200 205 210	
tcg acg cga cac tct att cct ctg ctc gtc ctc ggc ctg att cgg cta	783
Ser Thr Arg His Ser Ile Pro Leu Leu Val Leu Gly Leu Ile Arg Leu	
215 220 225	
tac agc gtc aaa ggc ttg gac tat gcg gag cac gtc acc gag tac ggc	831
Tyr Ser Val Lys Gly Leu Asp Tyr Ala Glu His Val Thr Glu Tyr Gly	
230 235 240	
gta cat tgg aac ttc ttc ttt aca ttg ggt ctt ttg cct ccg ttc gtg	879
Val His Trp Asn Phe Phe Phe Thr Leu Gly Leu Leu Pro Pro Phe Val	
245 250 255	
gag gtc ttc gac gcc ttg gct acg atc att ccg tca tac gag gtt ctc	927
Glu Val Phe Asp Ala Leu Ala Thr Ile Ile Pro Ser Tyr Glu Val Leu	
260 265 270 275	
tcc gtg ggg atc gcc gtc ttg tat caa gtt gcc cta gag tca aca gac	975
Ser Val Gly Ile Ala Val Leu Tyr Gln Val Ala Leu Glu Ser Thr Asp	
280 285 290	
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Leu Lys Ser Tyr Ile Leu Val Ser Pro Arg Gly Pro Ser Leu Leu Ser	
295 300 305	
aag aat cgt gaa ggc gtc ttc tcc ttc tca ggt tat ctc gcg att ttt	1071
Lys Asn Arg Glu Gly Val Phe Ser Phe Ser Gly Tyr Leu Ala Ile Phe	
310 315 320	
ctt gct ggt cgt gcg atc ggc att cgg ata atc cct cgc gga act tct	1119
Leu Ala Gly Arg Ala Ile Gly Ile Arg Ile Ile Pro Arg Gly Thr Ser	
325 330 335	
ttc tca aga agc cca gaa cag gcc agg aga cgg gtc ctg atc agc ctt	1167
Phe Ser Arg Ser Pro Glu Gln Ala Arg Arg Arg Val Leu Ile Ser Leu	
340 345 350 355	
ggc gtg caa gcg tta gtg tgg acc act ctt ttt gtg ttg aac tcc act	1215
Gly Val Gln Ala Leu Val Trp Thr Thr Leu Phe Val Leu Asn Ser Thr	
360 365 370	
tat gcg atg gga tac gga gct aat atc cct gtc tcc cgc cgc ctc gct	1263
Tyr Ala Met Gly Tyr Gly Ala Asn Ile Pro Val Ser Arg Arg Leu Ala	
375 380 385	
aac atg ccc tat gtc ctt tgg gtt tcg gcg ttc aac acc gcg caa ctg	1311
Asn Met Pro Tyr Val Leu Trp Val Ser Ala Phe Asn Thr Ala Gln Leu	
390 395 400	
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Phe Val Phe Cys Leu Ile Glu Thr Leu Cys Phe Pro Ala Val His Arg	
405 410 415	
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Thr Thr Thr Gln Glu Ser Glu Ser Glu Arg Val Asp Phe Ala Thr Ser	
420 425 430 435	

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cga atc atg tcg gcc ttc aat aag aac agt ctc gcg atc ttt ctt ttg 1455
Arg Ile Met Ser Ala Phe Asn Lys Asn Ser Leu Ala Ile Phe Leu Leu
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gcc aat ctt ctg act gga gct gtg aat ctg agc atc tcc aca att gat 1503
Ala Asn Leu Leu Thr Gly Ala Val Asn Leu Ser Ile Ser Thr Ile Asp
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gct aat aca gcg cag gcc atc gct gtt ctc att gga tat tca tcc att 1551
Ala Asn Thr Ala Gln Ala Ile Ala Val Leu Ile Gly Tyr Ser Ser Ile
                470                475                480

atc aca ggg gtt gct cta gca ttg cat cat gcc aat atc aaa gta ctt 1599
Ile Thr Gly Val Ala Leu Ala Leu His His Ala Asn Ile Lys Val Leu
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cct ttc tag ggtatttacg agcaattggt ggtgtgttga agatatatag 1648
Pro Phe
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Lys Ser Ala Lys Glu Ala Phe Val Ser Asp Asn Pro Gly Ala Ser Ile
    5                10                15                20

tgg agt atc aac gct gtc agc ctg gtc gca ctg gtatgtagct cgttctccga 156
Trp Ser Ile Asn Ala Val Ser Leu Val Ala Leu
                25                30

ggggttctgt catttggaga cgcttattaa ttgggatcgc ag gcg aca tat gct 210
                Ala Thr Tyr Ala
                35

ctc tgg atc gcc tta tcg ccg tac atc cgt cat gga ctc ctg aac aac 258
Leu Trp Ile Ala Leu Ser Pro Tyr Ile Arg His Gly Leu Leu Asn Asn

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tac	ctg	atc	tgt	gtt	ctt	ccc	cta	tta	ttc	ggg	gtg	acc	atc	ttc	tca	306				
Tyr	Leu	Ile	Cys	Val	Leu	Pro	Leu	Leu	Phe	Gly	Val	Thr	Ile	Phe	Ser					
			55					60					65							
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Thr	Ser	Pro	Leu	Val	Phe	Thr	Ser	Phe	Leu	Ser	Ile	Ile	Ser	Leu	Ala					
		70					75					80								
ttc	atc	acg	aaa	tcc	caa	aaa	tgc	ttc	aaa	tct	gtc	agt	tcg	ccc	gaa	402				
Phe	Ile	Thr	Lys	Ser	Gln	Lys	Cys	Phe	Lys	Ser	Val	Ser	Ser	Pro	Glu					
	85					90					95									
aag	cca	aaa	ggc	caa	tgg	cta	gac	gaa	tca	gac	tcc	gat	gag	gaa	cca	450				
Lys	Pro	Lys	Gly	Gln	Trp	Leu	Asp	Glu	Ser	Asp	Ser	Asp	Glu	Glu	Pro					
100					105					110					115					
gcg	gaa	cct	gct	tct	gca	gct	gga	tct	gca	gca	gtc	tca	cca	gta	aag	498				
Ala	Glu	Pro	Ala	Ser	Ala	Ala	Gly	Ser	Ala	Ala	Val	Ser	Pro	Val	Lys					
				120					125					130						
ctt	cta	cct	tcc	caa	gtg	gcg	ttc	gct	tcg	gga	tcc	cta	tta	tct	ccc	546				
Leu	Leu	Pro	Ser	Gln	Val	Ala	Phe	Ala	Ser	Gly	Ser	Leu	Leu	Ser	Pro					
			135					140					145							
gat	ccg	aca	aca	tcc	ccc	atg	tcg	cca	agt	agt	tct	tca	gct	tca	gga	594				
Asp	Pro	Thr	Thr	Ser	Pro	Met	Ser	Pro	Ser	Ser	Ser	Ser	Ala	Ser	Gly					
		150					155					160								
cat	gaa	gac	cct	ttg	ggg	att	atg	ggc	gtt	aac	aga	cgg	agg	tcg	cta	642				
His	Glu	Asp	Pro	Leu	Gly	Ile	Met	Gly	Val	Asn	Arg	Arg	Arg	Ser	Leu					
	165					170					175									
tta	gaa	gga	gtt	tcg	ctt	gat	gtt	ccg	tca	cat	atc	gac	tcc	aag	gtc	690				
Leu	Glu	Gly	Val	Ser	Leu	Asp	Val	Pro	Ser	His	Ile	Asp	Ser	Lys	Val					
180					185					190					195					
aga	ata	tct	cct	gtt	ccc	tac	ttg	agg	ctc	aaa	aag	tct	agg	gca	acg	738				
Arg	Ile	Ser	Pro	Val	Pro	Tyr	Leu	Arg	Leu	Lys	Lys	Ser	Arg	Ala	Thr					
				200					205					210						
aag	gcg	caa	tgg	gtg	aaa	gaa	aag	gga	aga	tta	cca	ttt	ttg	aca	gtg	786				
Lys	Ala	Gln	Trp	Val	Lys	Glu	Lys	Gly	Arg	Leu	Pro	Phe	Leu	Thr	Val					
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tac	cga	gcg	cac	atg	atg	ctc	atg	act	gtt	atc	tgc	atc	ttg	gcg	gta	834				
Tyr	Arg	Ala	His	Met	Met	Leu	Met	Thr	Val	Ile	Cys	Ile	Leu	Ala	Val					
		230					235					240								
gat	ttt	gaa	gtg	ttt	cct	aga	tgg	cag	ggc	aag	tgc	gaa	gat	ttt	ggc	882				
Asp	Phe	Glu	Val	Phe	Pro	Arg	Trp	Gln	Gly	Lys	Cys	Glu	Asp	Phe	Gly					
	245					250					255									
act	agt	ctg	gtaagctttc cttcagccat ggtccagtgc tcaccgctct													931				
Thr	Ser	Leu														260				
acttgccgta	g	atg	gac	gtg	ggc	gtc	ggg	tca	ttc	gtc	ttt	tcc	ctc	ggc		981				
		Met	Asp	Val	Gly	Val	Gly	Ser	Phe	Val	Phe	Ser	Leu	Gly						
				265						270				275						



ctc gtc tcc aca aaa tct ott tct cct cca cct cca act cct acg ccc	1029
Leu Val Ser Thr Lys Ser Leu Ser Pro Pro Pro Pro Thr Pro Thr Pro	
280 285 290	
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Ser Ser Pro Ala Leu Asn Ser His Ile Ile Pro Leu Thr Pro Ser Pro	
295 300 305	
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Phe Thr Ser Ile Leu Ile Ser Leu Arg Lys Ser Ile Pro Ile Leu Val	
310 315 320	
ctc ggc ttt ata cgg ttg att atg gtc aag gga tct gat tat cct gag	1173
Leu Gly Phe Ile Arg Leu Ile Met Val Lys Gly Ser Asp Tyr Pro Glu	
325 330 335	
cat gtg acg gag tac ggc gtg cac tgg aat ttc ttc ttc acc ctc gca	1221
His Val Thr Glu Tyr Gly Val His Trp Asn Phe Phe Phe Thr Leu Ala	
340 345 350 355	
ttg gtt cct gtg ctc gcc gtg ggc att cga cca ttg acg cag tgg ctt	1269
Leu Val Pro Val Leu Ala Val Gly Ile Arg Pro Leu Thr Gln Trp Leu	
360 365 370	
cgc tgg agt gtg ctt ggg gta atc atc tct ttg ctg cat cag ctg tgg	1317
Arg Trp Ser Val Leu Gly Val Ile Ile Ser Leu Leu His Gln Leu Trp	
375 380 385	
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Leu Thr Tyr Tyr Leu Gln Ser Ile Val Phe Ser Phe Gly Arg Ser Gly	
390 395 400	
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Ile Phe Leu Ala Asn Lys Glu Gly Phe Ser Ser Leu Pro Gly Tyr Leu	
405 410 415	
tcc ata ttt ttg atc ggc ttg tct att gga gat cat gtt tta agg ctc	1461
Ser Ile Phe Leu Ile Gly Leu Ser Ile Gly Asp His Val Leu Arg Leu	
420 425 430 435	
agt tta cca cca aga aga gag agg gtc gtg tca gaa aca aat gaa gag	1509
Ser Leu Pro Pro Arg Arg Glu Arg Val Val Ser Glu Thr Asn Glu Glu	
440 445 450	
cat gag cag agt cat ttt gag aga aaa aaa ttg gat ttg att atg gag	1557
His Glu Gln Ser His Phe Glu Arg Lys Lys Leu Asp Leu Ile Met Glu	
455 460 465	
ttg att gga tat agc tta ggc tgg tgg gca ctc tta gga ggc tgg att	1605
Leu Ile Gly Tyr Ser Leu Gly Trp Trp Ala Leu Leu Gly Gly Trp Ile	
470 475 480	
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Trp Ala Gly Gly Glu Val Ser Arg Arg Leu	
485 490	
atattgtacc tataactaatc cctgcataaa g gcc aac gct cct tat gta ttt	1707
Ala Asn Ala Pro Tyr Val Phe	
495 500	

tgg gta gcg gca tac aat acc acc ttt ctc ctc ggc tac ctc ctc ctt	1755
Trp Val Ala Ala Tyr Asn Thr Thr Phe Leu Leu Gly Tyr Leu Leu Leu	
505 510 515	
acc cac att att cca tct ccc acc tct tcc caa aca tca cca tcg atc	1803
Thr His Ile Ile Pro Ser Pro Thr Ser Ser Gln Thr Ser Pro Ser Ile	
520 525 530	
tta gtg cct ccc ttg ctc gac gct atg aat aaa aac ggt ctc gcg ata	1851
Leu Val Pro Pro Leu Leu Asp Ala Met Asn Lys Asn Gly Leu Ala Ile	
535 540 545	
ttt ttg gcg gcc aac ttg ctt aca gga ctg gtg aat gtg agc atg aag	1899
Phe Leu Ala Ala Asn Leu Leu Thr Gly Leu Val Asn Val Ser Met Lys	
550 555 560	
aca atg tat gcg ccg gcg tgg ttg tca atg ggg gtg tta atg ttg tat	1947
Thr Met Tyr Ala Pro Ala Trp Leu Ser Met Gly Val Leu Met Leu Tyr	
565 570 575 580	
acc ttg aca atc agt tgt gta ggg tgg ata ctg aaa gga cgg agg atc	1995
Thr Leu Thr Ile Ser Cys Val Gly Trp Ile Leu Lys Gly Arg Arg Ile	
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Lys Ile	

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ggg gct tct atc tgg agt atc aac gct gtc agc ctg gtc gca ctg gcg	96
Gly Ala Ser Ile Trp Ser Ile Asn Ala Val Ser Leu Val Ala Leu Ala	
20 25 30	
aca tat gct ctc tgg atc gcc tta tcg ccg tac atc cgt cat gga ctc	144
Thr Tyr Ala Leu Trp Ile Ala Leu Ser Pro Tyr Ile Arg His Gly Leu	
35 40 45	
ctg aac aac tac ctg atc tgt gtt ctt ccc cta tta ttc ggg gtg acc	192
Leu Asn Asn Tyr Leu Ile Cys Val Leu Pro Leu Leu Phe Gly Val Thr	
50 55 60	
atc ttc tca act tcg cct ctc gta ttt acc tct ttt ttg tcc att att	240
Ile Phe Ser Thr Ser Pro Leu Val Phe Thr Ser Phe Leu Ser Ile Ile	
65 70 75 80	
tcc ctc gct ttc atc acg aaa tcc caa aaa tgc ttc aaa tct gtc agt	288
Ser Leu Ala Phe Ile Thr Lys Ser Gln Lys Cys Phe Lys Ser Val Ser	

85										90					95					
tcg	ccc	gaa	aag	cca	aaa	ggc	caa	tgg	cta	gac	gaa	tca	gac	tcc	gat	336				
Ser	Pro	Glu	Lys	Pro	Lys	Gly	Gln	Trp	Leu	Asp	Glu	Ser	Asp	Ser	Asp					
			100					105					110							
gag	gaa	cca	gcg	gaa	cct	gct	tct	gca	gct	gga	tct	gca	gca	gtc	tca	384				
Glu	Glu	Pro	Ala	Glu	Pro	Ala	Ser	Ala	Ala	Gly	Ser	Ala	Ala	Val	Ser					
		115					120					125								
cca	gta	aag	ctt	cta	cct	tcc	caa	gtg	gcg	ttc	gct	tcg	gga	tcc	cta	432				
Pro	Val	Lys	Leu	Leu	Pro	Ser	Gln	Val	Ala	Phe	Ala	Ser	Gly	Ser	Leu					
	130					135					140									
tta	tct	ccc	gat	ccg	aca	aca	tcc	ccc	atg	tcg	cca	agt	agt	tct	tca	480				
Leu	Ser	Pro	Asp	Pro	Thr	Thr	Ser	Pro	Met	Ser	Pro	Ser	Ser	Ser	Ser					
145					150					155					160					
gct	tca	gga	cat	gaa	gac	cct	ttg	ggg	att	atg	ggc	gtt	aac	aga	cgg	528				
Ala	Ser	Gly	His	Glu	Asp	Pro	Leu	Gly	Ile	Met	Gly	Val	Asn	Arg	Arg					
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agg	tcg	cta	tta	gaa	gga	gtt	tcg	ctt	gat	gtt	ccg	tca	cat	atc	gac	576				
Arg	Ser	Leu	Leu	Glu	Gly	Val	Ser	Leu	Asp	Val	Pro	Ser	His	Ile	Asp					
			180					185					190							
tcc	aag	gtc	aga	ata	tct	cct	gtt	ccc	tac	ttg	agg	ctc	aaa	aag	tct	624				
Ser	Lys	Val	Arg	Ile	Ser	Pro	Val	Pro	Tyr	Leu	Arg	Leu	Lys	Lys	Ser					
		195					200					205								
agg	gca	acg	aag	gcg	caa	tgg	gtg	aaa	gaa	aag	gga	aga	tta	cca	ttt	672				
Arg	Ala	Thr	Lys	Ala	Gln	Trp	Val	Lys	Glu	Lys	Gly	Arg	Leu	Pro	Phe					
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ttg	aca	gtg	tac	cga	gcg	cac	atg	atg	ctc	atg	act	gtt	atc	tgc	atc	720				
Leu	Thr	Val	Tyr	Arg	Ala	His	Met	Met	Leu	Met	Thr	Val	Ile	Cys	Ile					
225					230					235				240						
ttg	gcg	gta	gat	ttt	gaa	gtg	ttt	cct	aga	tgg	cag	ggc	aag	tgc	gaa	768				
Leu	Ala	Val	Asp	Phe	Glu	Val	Phe	Pro	Arg	Trp	Gln	Gly	Lys	Cys	Glu					
				245				250						255						
gat	ttt	ggc	act	agt	ctg	atg	gac	gtg	ggc	gtc	ggg	tca	ttc	gtc	ttt	816				
Asp	Phe	Gly	Thr	Ser	Leu	Met	Asp	Val	Gly	Val	Gly	Ser	Phe	Val	Phe					
			260				265					270								
tcc	ctc	ggc	ctc	gtc	tcc	aca	aaa	tct	ctt	tct	cct	cca	cct	cca	act	864				
Ser	Leu	Gly	Leu	Val	Ser	Thr	Lys	Ser	Leu	Ser	Pro	Pro	Pro	Pro	Thr					
		275					280					285								
cct	acg	ccc	tcc	tcg	ccc	gct	ctc	aac	tct	cac	atc	att	ccc	ctc	acc	912				
Pro	Thr	Pro	Ser	Ser	Pro	Ala	Leu	Asn	Ser	His	Ile	Ile	Pro	Leu	Thr					
	290					295					300									
ccg	tcc	ccg	ttc	act	tcc	atc	ctc	atc	tcg	ctc	cga	aaa	tcc	atc	ccc	960				
Pro	Ser	Pro	Phe	Thr	Ser	Ile	Leu	Ile	Ser	Leu	Arg	Lys	Ser	Ile	Pro					
305					310					315					320					

atc ctc gtc ctc ggc ttt ata cgg ttg att atg gtc aag gga tct gat	1008
Ile Leu Val Leu Gly Phe Ile Arg Leu Ile Met Val Lys Gly Ser Asp	
325 330 335	
tat cct gag cat gtg acg gag tac ggc gtg cac tgg aat ttc ttc ttc	1056
Tyr Pro Glu His Val Thr Glu Tyr Gly Val His Trp Asn Phe Phe Phe	
340 345 350	
acc ctc gca ttg gtt cct gtg ctc gcc gtg ggc att cga cca ttg acg	1104
Thr Leu Ala Leu Val Pro Val Leu Ala Val Gly Ile Arg Pro Leu Thr	
355 360 365	
cag tgg ctt cgc tgg agt gtg ctt ggg gta atc atc tct ttg ctg cat	1152
Gln Trp Leu Arg Trp Ser Val Leu Gly Val Ile Ile Ser Leu Leu His	
370 375 380	
cag ctg tgg tta aca tat tat ctc caa tcc atc gtc ttc tca ttc ggc	1200
Gln Leu Trp Leu Thr Tyr Tyr Leu Gln Ser Ile Val Phe Ser Phe Gly	
385 390 395 400	
cgg tca ggt atc ttt cta gca aac aag gaa ggc ttc tcc tct ctt cct	1248
Arg Ser Gly Ile Phe Leu Ala Asn Lys Glu Gly Phe Ser Ser Leu Pro	
405 410 415	
ggt tat ctt tcc ata ttt ttg atc ggc ttg tct att gga gat cat gtt	1296
Gly Tyr Leu Ser Ile Phe Leu Ile Gly Leu Ser Ile Gly Asp His Val	
420 425 430	
tta agg ctc agt tta cca cca aga aga gag agg gtc gtg tca gaa aca	1344
Leu Arg Leu Ser Leu Pro Pro Arg Arg Glu Arg Val Val Ser Glu Thr	
435 440 445	
aat gaa gag cat gag cag agt cat ttt gag aga aaa aaa ttg gat ttg	1392
Asn Glu Glu His Glu Gln Ser His Phe Glu Arg Lys Lys Leu Asp Leu	
450 455 460	
att atg gag ttg att gga tat agc tta ggc tgg tgg gca ctc tta gga	1440
Ile Met Glu Leu Ile Gly Tyr Ser Leu Gly Trp Trp Ala Leu Leu Gly	
465 470 475 480	
ggc tgg att tgg gcc ggc ggg gag gta tcc agg cgt tta gcc aac gct	1488
Gly Trp Ile Trp Ala Gly Gly Glu Val Ser Arg Arg Leu Ala Asn Ala	
485 490 495	
cct tat gta ttt tgg gta gcg gca tac aat acc acc ttt ctc ctc ggc	1536
Pro Tyr Val Phe Trp Val Ala Ala Tyr Asn Thr Thr Phe Leu Leu Gly	
500 505 510	
tac ctc ctc ctt acc cac att att cca tct ccc acc tct tcc caa aca	1584
Tyr Leu Leu Leu Thr His Ile Ile Pro Ser Pro Thr Ser Ser Gln Thr	
515 520 525	
tca cca tcg atc tta gtg cct ccc ttg ctc gac gct atg aat aaa aac	1632
Ser Pro Ser Ile Leu Val Pro Pro Leu Leu Asp Ala Met Asn Lys Asn	
530 535 540	
ggt ctc gcg ata ttt ttg gcg gcc aac ttg ctt aca gga ctg gtg aat	1680
Gly Leu Ala Ile Phe Leu Ala Ala Asn Leu Thr Gly Leu Val Asn	
545 550 555 560	
gtg agc atg aag aca atg tat gcg ccg gcg tgg ttg tca atg ggg gtg	1728

Val Ser Met Lys Thr Met Tyr Ala Pro Ala Trp Leu Ser Met Gly Val  
 565 570 575

tta atg ttg tat acc ttg aca atc agt tgt gta ggg tgg ata ctg aaa 1776  
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gga cgg agg atc aag ata tag 1797  
 Gly Arg Arg Ile Lys Ile  
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Thr Tyr Ala Leu Trp Ile Ala Leu Ser Pro Tyr Ile Arg His Gly Leu  
 35 40 45

Leu Asn Asn Tyr Leu Ile Cys Val Leu Pro Leu Leu Phe Gly Val Thr  
 50 55 60

Ile Phe Ser Thr Ser Pro Leu Val Phe Thr Ser Phe Leu Ser Ile Ile  
 65 70 75 80

Ser Leu Ala Phe Ile Thr Lys Ser Gln Lys Cys Phe Lys Ser Val Ser  
 85 90 95

Ser Pro Glu Lys Pro Lys Gly Gln Trp Leu Asp Glu Ser Asp Ser Asp  
 100 105 110

Glu Glu Pro Ala Glu Pro Ala Ser Ala Ala Gly Ser Ala Ala Val Ser  
 115 120 125

Pro Val Lys Leu Leu Pro Ser Gln Val Ala Phe Ala Ser Gly Ser Leu  
 130 135 140

Leu Ser Pro Asp Pro Thr Thr Ser Pro Met Ser Pro Ser Ser Ser Ser  
 145 150 155 160

Ala Ser Gly His Glu Asp Pro Leu Gly Ile Met Gly Val Asn Arg Arg  
 165 170 175

Arg Ser Leu Leu Glu Gly Val Ser Leu Asp Val Pro Ser His Ile Asp  
 180 185 190

Ser Lys Val Arg Ile Ser Pro Val Pro Tyr Leu Arg Leu Lys Lys Ser  
 195 200 205

Arg Ala Thr Lys Ala Gln Trp Val Lys Glu Lys Gly Arg Leu Pro Phe  
 210 215 220

Leu Thr Val Tyr Arg Ala His Met Met Leu Met Thr Val Ile Cys Ile

225		230		235		240
Leu Ala Val Asp	Phe Glu Val Phe Pro Arg Trp Gln Gly Lys Cys Glu					
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Asp Phe Gly Thr	Ser Leu Met Asp Val Gly Val Gly Ser Phe Val Phe					
	260		265			270
Ser Leu Gly Leu Val Ser Thr Lys Ser Leu Ser Pro Pro Pro Pro Thr						
	275		280		285	
Pro Thr Pro Ser Ser Pro Ala Leu Asn Ser His Ile Ile Pro Leu Thr						
	290		295		300	
Pro Ser Pro Phe Thr Ser Ile Leu Ile Ser Leu Arg Lys Ser Ile Pro						
305		310		315		320
Ile Leu Val Leu Gly Phe Ile Arg Leu Ile Met Val Lys Gly Ser Asp						
	325		330			335
Tyr Pro Glu His Val Thr Glu Tyr Gly Val His Trp Asn Phe Phe Phe						
	340		345		350	
Thr Leu Ala Leu Val Pro Val Leu Ala Val Gly Ile Arg Pro Leu Thr						
	355		360		365	
Gln Trp Leu Arg Trp Ser Val Leu Gly Val Ile Ile Ser Leu Leu His						
	370		375		380	
Gln Leu Trp Leu Thr Tyr Tyr Leu Gln Ser Ile Val Phe Ser Phe Gly						
385		390		395		400
Arg Ser Gly Ile Phe Leu Ala Asn Lys Glu Gly Phe Ser Ser Leu Pro						
	405		410			415
Gly Tyr Leu Ser Ile Phe Leu Ile Gly Leu Ser Ile Gly Asp His Val						
	420		425		430	
Leu Arg Leu Ser Leu Pro Pro Arg Arg Glu Arg Val Val Ser Glu Thr						
	435		440		445	
Asn Glu Glu His Glu Gln Ser His Phe Glu Arg Lys Lys Leu Asp Leu						
	450		455		460	
Ile Met Glu Leu Ile Gly Tyr Ser Leu Gly Trp Trp Ala Leu Leu Gly						
465		470		475		480
Gly Trp Ile Trp Ala Gly Gly Glu Val Ser Arg Arg Leu Ala Asn Ala						
	485		490			495
Pro Tyr Val Phe Trp Val Ala Ala Tyr Asn Thr Thr Phe Leu Leu Gly						
	500		505		510	
Tyr Leu Leu Leu Thr His Ile Ile Pro Ser Pro Thr Ser Ser Gln Thr						
	515		520		525	
Ser Pro Ser Ile Leu Val Pro Pro Leu Leu Asp Ala Met Asn Lys Asn						
	530		535		540	
Gly Leu Ala Ile Phe Leu Ala Ala Asn Leu Leu Thr Gly Leu Val Asn						

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 Val Ser Met Lys Thr Met Tyr Ala Pro Ala Trp Leu Ser Met Gly Val  
                                  565                      570                      575  
 Leu Met Leu Tyr Thr Leu Thr Ile Ser Cys Val Gly Trp Ile Leu Lys  
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 Gly Arg Arg Ile Lys Ile  
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 <213> Artificial sequence

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<210> 16  
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<220>  
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                                  synthesized primer sequence

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 <212> DNA  
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